SerenA

Forth, Jamie; Giannimaras, Thanasis; Wiggins, Geraint A. ; Stewart, Robert; Bental, Diana; Aylett, Ruth

Published in:
Advances on Practical Applications of Agents and Multi-Agent Systems

DOI:
10.1007/978-3-642-38073-0_8

Publication date:
2013

Document Version
Early version, also known as pre-print

Demonstrating SerenA: Chance Encounters in the Space of Ideas

Jamie Forth[1], Athanasios Giannimaras[1], Geraint A. Wiggins[1],
Robert Stewart[2], Diana Bental[2], Ruth Aylett[2],
Deborah Maxwell[3], Hadi Mehrpouya[3], Jamie Shek[3], and Mel Woods[3]

[1] School of Electronic Engineering and Computer Science
Queen Mary University of London, Mile End Road, London, England, E1 4NS
[2] School of Mathematical and Computer Sciences
Heriot-Watt University, Edinburgh, Scotland, EH14 4AS
[3] Duncan of Jordanstone College of Art and Design
University of Dundee, Perth Road, Dundee, Scotland, DD1 4HT

1 Introduction

We demonstrate SerenA, a multi-site, pervasive, agent environment that suppers serendipitous discovery in research. SerenA attempts to assist researchers by presenting them with information that they did not know they needed to know about their research. In this demonstration, we show:

- Public SerenA: Streamed information from a library, displayed to stimulate ideas;
- SerenA user modelling: On-line discovery of user information and inspectable user model;
- SerenA suggesting: User's notes and suggestions for reading;
- SerenA intervening: Informed academic match-making by the agent system.

If possible, we will demonstrate further progress in the project beyond the above at the conference. If the networking facilities at the conference allow, delegates will be able to take part in the demos via their browsers. It will not be possible to download the SerenA Notebook App, because of technical restrictions applied by the Android App Store.

2 Public SerenA

Our first demo is of public SerenA. It is conceived in the context of a major UK city library. It is architecturally melded with the building, in that its outputs are projected directly on to walls, using site-specific designs that integrate with the architecture. Its outputs consist of simple visualisations (the simplest being mere text) of documents that are ordered via the library's on-line order system. The information is filtered, so that no connection with the library user ordering it can be made: their name is not displayed, nor is the time at which they placed their order. Various display methods are implemented. The aim of the installation

(and the demo) is to stimulate ideas in people viewing, that are connected with recent activity in the Library. A simple example design is given by Forth et al. [1, Fig. 2]; here we demonstrate more abitious designs.

This demo is simple as far as the agent system is concerned. A shadow agent [1, §2.1] receives text input in an agreed format from an authenticated data source. The agent preprocesses the data into the internal RDF representation, and sends it directly to another shadow agent, which shadows the devices that are displaying the information. Authentication is available, but in this demo we omit it[4] so that conference delegates may connect and watch the demo. See `www.serena.ac.uk/paamsdemo/` for technical details of downloads to use the service.

3 SERENA user modelling

SERENA builds a model of its user, including information given by the user, information inferred directly under the control of the user, and information inferred about the user by the system. The modelling process is kick-started by our Discover.Me.Semantically service[5], which searches for information about a new user, and then consults with them to select what is relevant. Discover.Me.Semantically is a web-based tool that allows its user to author RDF representing their professional and personal interests, skills and expertise. The stand-alone implementation allows the user to download this RDF representation as a file to be hosted on their own web pages; here, in the version avaialable from `www.serena.ac.uk/paamsdemo/`, we download your information[6] into the SERENA user model, and allow you to inspect it, using a third-party web resource designed for that purpose.

This part of the demo does not engage the agent system, but the RDF user model is crucial to SERENA's operation, so it is important underpinning technology.

4 SERENA suggesting

A key issue in supplying the user with useful information is to understand the research goals that they are expressing in their notes, files and email[7]. We use the GATE natural language processing system[8]to detect goals in natural language sentences [2], and an ontology for goals has been defined [4].

[4] No sensitive information is available in the demo system.

[5] Source code under GPLv3 license: `https://github.com/robstewart57/discover-me-semantically`. Running instance: `http://serena.macs.hw.ac.uk/serena/discover-me-semantically/`

[6] By proceeding with the Discover.Me.Semantically process, you agree for us to store your data temporarily. However, we promise to delete it after the conference, and not to use it for anything other than our demo meanwhile.

[7] Of course, SERENA does not access files or email without permission.

[8] `http://gate.ac.uk`

This part of the demo focuses on the SerenA Semantic Notebook App [1, 3] for Android. The researcher-user is invited to make notes, add tagged images, keywords, and so on, all in free text. Interaction with the user is then managed by SerenA processing the user's text, and then adding annotations (e.g., items of text, web links), to the notes, making the distinction between the user's notes and SerenA's additions clear by means of typography. Example views are given by Forth et al. [1, Fig. 1].

From the agent perspective, when the user adds a new note, it is passed by the Android device via its shadow agent into the agent user model (which is where the user's notes are stored). The agent also broadcasts the arrival of the note, as a piece of text associated with a given user, to the entire agent system. At this point, any agent that is capable of processing text may process it and attempt to do something with the result. Here, we focus on the goal-detection agent, which processes the text and, if it finds a research goal, attempts to express in RDF what that goal is. If it is successful, the goal is added to the user model (with provenance, so that it can be undone if later proven incorrect, and also so that its effect can be time-appropriate). The goal is also broadcast, identified as such in RDF, so that agents with expertise on goals may operate on it. Here we focus on a simple lookup agent, that receives the broadcast goal, recognises the action in the goal (for example, "find out about", or "look up") as a research goal, and looks up its object (the thing sought) on DBpedia. If it is successful, then it reports the fact to the user model, which takes the resulting suggestion and adds it to the notebook in the user model. As a result of doing this, a visual representation of the suggestion appears in the notebook, associated with the note that gave rise to it.

In more realistic situations than this simple demo, this kind of decoupled interaction is advantageous for two reasons: first, SerenA must avoid the paperclip effect[9]; and, second, the reasoning required to suppress pointless or dull information is often extensive, and cannot be performed on the fly, while the user waits. The concomitant advantage of asynchrony is that network outages do not degrade the experience: the user will come to expect SerenA suggestions at some time after they make their notes, but not immediately.

5 SerenA intervening

The final part of our planned demo builds on the situation above, introducing new users, who are co-located at a conference in Salamanca. As the first user makes a note, and it content resonates around the agent community, as above, the second users' agents receive the broadcast, noting that that user has made notes on a closely related topic. Both users are informed, via their notebooks, that the other is present at the conference, and an appropriate web reference is given, to enable them to look each other up.

[9] The irritation produced when Microsoft's Clippy character used to intrude unexpectedly, distracting the user from their task, with often incorrect information.

Acknowledgements

This work is supported by EPSRC Sandpit Research Grant EP/H042741/1 – SerenA: Chance encounters in the Space of Ideas.

References

1. J. Forth, T. Giannimaras, G. A. Wiggins, R. Stewart, D. Bental, R. Aylett, D. Maxwell, H. Mehrpouya, J. Shek, and M. Woods3. Serena: A multi-site pervasive agent environment that supports serendipitous discovery in research. In Y. Demazeau, T. Ishida, J. M. Corchado, and J. Bajo, editors, *Practical applications of agents and multi-agent systems*, Advances in Intelligent and Soft Computing. Springer, 2013.
2. A. Giannimaras. Goal detection in natural language text. Msc thesis, School of Electronic Engineering and Computer Science, Queen Mary University of London, 2012.
3. D. Maxwell, M. Woods, S. Makri, D. Bental, G. Kefalidou, and S. Sharples. Designing a semantic sketchbook to create opportunities for serendipity. In *Proceedings of BCS HCI Conference*, 2012.
4. S. Piao, D. Bental, J. Whittle, R. Aylett, S. Makri, and X. Sun. A pilot study: Deriving a users' goal framework from a corpus of interviews and diaries. In *Proceedings of the Workshop on Semantic Relations II - Enhancing Resources and Applications*, 2012.